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(71) Applicant: **KLA-TENCOR CORPORATION** [US/US]; 160 Rio Robles, San Jose, CA 95134-1809 (US).

(72) Inventors: **SHCHEGROV, Andrei, V.**; 325 Union Avenue, Apt. 359, Campbell, CA 95008 (US). **FABRIKANT, Anatoly**; 2245 Olive Avenue, Fremont, CA 94539 (US). **NIKOONAHAD, Mehrdad**; 271 Oakhurst Place, Menlo Park, CA 94025 (US). **LEVY, Ady**; 1621 Samedra Street, Sunnyvale, CA 94087 (US). **WACK, Daniel, C.**; 930 Lundy Lane, Los Altos, CA 92024 (US). **BAREKET, Noah**; 12344 Saraglen Drive, Saratoga, CA 95070 (US). **MIEHER, Walter**; 1750 Nantucket Circle, Apt. 332, Santa Clara, CA 95054 (US). **DZIURA, Ted**; 3664 Tunis Avenue, San Jose, CA 95132 (US).

(74) Agents: **HSUE, James, S.** et al.; Parsons Hsue & de Runtz LLP, 655 Montgomery Street, Suite 1800, San Francisco, CA 94111 (US).

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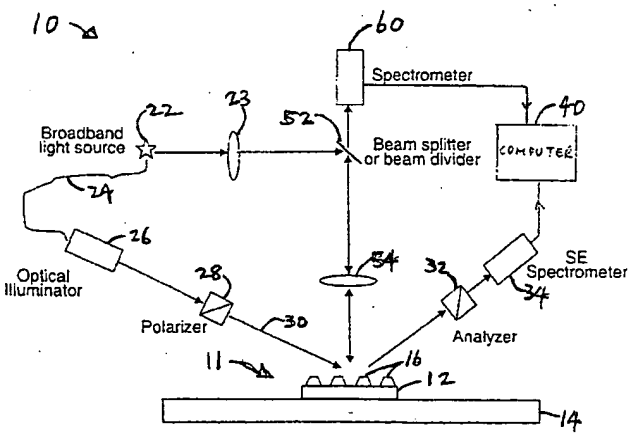
(54) Title: PARAMETRIC PROFILING USING OPTICAL SPECTROSCOPIC SYSTEMS



(57) Abstract: A gallery of seed profiles is constructed and the initial parameter values associated with the profiles are selected using manufacturing process knowledge of semiconductor devices. Manufacturing process knowledge may also be used to select the best seed profile and the best set of initial parameter values as the starting point of an optimization process whereby data associated with parameter values of the profile predicted by a model is compared to measured data in order to arrive at values of the parameters. Film layers over or under the periodic structure may also be taken into account. Different radiation parameters such as the reflectivities Rs, Rp and ellipsometric parameters may be used in measuring the diffracting structures and the associated films. Some of the radiation parameters may be more sensitive to a change in the parameter value of the profile or of the films then other radiation parameters. One or more radiation parameters that are more sensitive to such changes may be selected in the above-described optimization process to arrive at a more accurate measurement. The above-described techniques may be supplied to a track/stepper and etcher to control the lithographic and etching processes in order to compensate for any errors in the profile parameters.

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